

**CLAIMS**

What is claimed is:

1. A signal controlled laser oscillator comprising:  
a signal controlled laser oscillator that receives a fixed bias input signal and outputs an optical frequency signal  $f_0 + f_m$ ;  
a signal controlled microwave oscillator that receives a frequency control input signal and outputs a microwave frequency signal,  $f_m$ ; and  
5 a single sideband mixer that processes the signal output by the laser oscillator and microwave oscillator to output a single controlled optical frequency signal.

2. The signal controlled laser oscillator recited in Claim 1 wherein the single sideband mixer comprises an optical single sideband mixer comprising:  
a zero degree power splitter coupled to an output of the signal controlled laser oscillator;  
5 a ninety degree hybrid coupler coupled to an output of the signal controlled microwave oscillator;  
first and second optical modulators having first inputs coupled to first outputs of the power splitter and hybrid coupler, and having second inputs coupled to second outputs of the power splitter and hybrid coupler; and  
10 an output ninety degree hybrid coupler coupled to outputs of the first and second optical modulators for outputting upper sideband and lower sideband output signals.

3. The signal controlled laser oscillator recited in Claim 2 wherein the upper sideband output signal is at frequency  $f_0 + 2xf_m$  and the lower sideband output signal is at frequency  $f_0$ .

4. A signal controlled laser oscillator comprising:  
a signal controlled laser oscillator that receives a fixed bias input signal that outputs an optical frequency,  $f_0$ ;  
a signal controlled microwave oscillator having a frequency control input signal  
5 that outputs a microwave frequency,  $f_m$ ;  
a single sideband mixer that comprises a radio frequency single sideband mixer comprising:

a zero degree power splitter coupled to an output of the signal controlled laser oscillator;

10 a ninety degree hybrid coupler coupled to an output of the signal controlled microwave oscillator;

first and second optical modulators having first inputs coupled to first outputs of the power splitter and hybrid coupler, and having second inputs coupled to second outputs of the power splitter and hybrid coupler; and

15 an output ninety degree hybrid coupler coupled to outputs of the first and second optical modulators for outputting upper sideband and lower sideband output signals.

5. The signal controlled laser oscillator recited in Claim 4 wherein the upper sideband output signal is at frequency  $f_0 + 2xf_m$  and the lower sideband output signal is at frequency  $f_0$ .

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